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ally being attacked, sometimes openly, sometimes insidiously. It is all-important, therefore, that medical men and women should band themselves together for the common protection of themselves and the profession to which they belong, and to this end join the British Medical Association. For the objects of this body are to promote the progress of medical science and the interests of the medical profession, and its past history shows that it has well fulfilled them.—*The British Medical Journal*.

SCIENTIFIC BOOKS

The Wings of Insects. By J. H. COMSTOCK. Ithaca, N. Y., The Comstock Publication Company. Pp. xviii + 423, 9 plates and 427 figs.

In these days of distraction from pure science it is a pleasure to note the appearance of Professor Comstock's book on the wings of insects. The whole book is devoted to an exposition of the uniform terminology of the wing veins of insects, a field of scientific research in which Professor Comstock has long been preeminent. The book is founded upon the now well-known theory that the wing veins of insects can only be homologized by a study of the tracheæ which precede them. The historical phases of this theory are discussed together with the general features and development of the wings of insects. A general chapter that ought to be appreciated is the one on paleontological data. Professor Comstock's conclusion after reviewing the various fossil forms is: "A study of the paleontological data confirms to a remarkable degree the conclusions drawn from the study of the ontogeny of living insects as to the probable primitive type of wing venation."

Following the general chapters are special chapters devoted to the wings of the various orders of insects. In these chapters the author has not only used the results of his original investigations but has also used the results of various workers who have given special attention to the different groups. These two sources of information have been welded into a concrete whole that taken to-

gether with the illustrations both of wing tracheation and venation can not help but convince entomologists not only of the desirability of a uniform terminology but also of the firmness of the foundation upon which the Comstock system is based.

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THE PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

THE fourth number of Volume of the *Proceedings of the National Academy of Sciences* contains the following articles:

Dynamical aspects of photosynthesis: W. J. V. OSTERHOUT and A. R. C. HAAS, Laboratory of Plant Physiology, Harvard University. *Ulva*, which has been kept in the dark begins photosynthesis as soon as it is exposed to sunlight. The rate of photosynthesis steadily increases until a constant speed is attained. This may be explained by assuming that sunlight decomposes a substance whose products catalyze photosynthesis or enter directly into the reaction. Quantitative theories are developed to account for the facts.

Mobilities of ions in air, hydrogen and nitrogen: KIA-LOK YEN, Ryerson Physical Laboratory, University of Chicago. Extensive experiments, the results of which are in perfect accord with the "small-ion" hypothesis, as contrasted with the "cluster" hypothesis.

Thermo-electric action with dual conduction of electricity: EDWIN H. HALL, Jefferson Physical Laboratory, Harvard University. A continuation of previous papers. The hypothesis of progressive motion by the "free" electrons only has been extended to the case of dual electric conduction.

Terrestrial temperature and atmospheric absorption: C. G. ABBOT, Astrophysical Observatory, Smithsonian Institution. The earth's surface sends out 0.50 calorie per cm² per minute on the average, and of this only a small part escapes to space. Hence, the atmosphere is the main radiating source, furnishing three fourths of the output of radiation of the earth as a planet.

Mobilities of ions in vapors: KIA-LOK YEN, Ryerson Physical Laboratory, University of Chicago. A continuation of the study of the vapors SO_2 , $\text{C}_2\text{H}_6\text{O}$, $\text{C}_2\text{H}_4\text{O}$, C_5H_{12} , etc., with the conclusion that the small ion theory is further corroborated.

A contribution to the petrography of the South Sea Islands: J. P. IDDINGS and E. W. MORLEY, Brinklow, Md., and West Hartford, Conn. Thirty detailed chemical analyses of lava from the South Pacific Islands are given, with a discussion of the results.

The law controlling the quantity and rate of regeneration: JACQUES LOEB, Rockefeller Institute for Medical Research, New York. The quantity of regeneration in an isolated piece of an organism is under equal conditions determined by the mass of material necessary for growth circulating in the sap (or blood) of the piece. The mystifying phenomenon of an isolated piece restoring its lost organs thus turns out to be the result of two plain chemical factors, the law of mass action and the production and giving off of inhibitory substances in the growing regions of the organism.

National Research Council: Minutes of the first meeting of the Executive Board of War Organization; Research Information Committee.

THE fifth number of Volume 4 contains the following articles:

Some spectral characteristics of cepheid variables: W. S. ADAMS and A. H. JOY, Mt. Wilson Solar Observatory, Carnegie Institute of Washington. The hydrogen lines are abnormally strong in Cepheid spectra, which are classified first on a basis of the hydrogen lines, and, second, on the more general features of the spectra.

Types of achromatic fringes: CARL BARUS, Department of Physics, Brown University.

Interference of pencils which constitute the remote divergences from a slit: CARL BARUS, Department of Physics, Brown University.

A study of the motions of forty-eight double stars: ERIC DOOLITTLE, Flower Observatory, University of Pennsylvania. A classification of the stars is set up for the purpose of deter-

mining those pairs upon which observations are most urgently needed.

The structure of an electromagnetic field: H. BATEMAN, Throop College of Technology, Pasadena. All electrical charges are supposed to travel along rectilinear paths with the velocity of light. When electricity appears to move with a smaller velocity, it is made up of different entities at different times.

Invariants which are functions of parameters of the transformation: OLIVER E. GLENN, Department of Mathematics, University of Pennsylvania. A general discussion of a systematic theory and interpretation of invariant functions which contain the parameters of the linear transformations which leaves invariant a binary quadratic form, including the invariants of relativity.

THE sixth number of Volume 4 contains the following articles:

Effects of a prolonged reduction in diet on twenty-five men: I. Influence on basal metabolism and nitrogen excretion: FRANCIS G. BENEDICT and PAUL ROTH, Nutrition Laboratory, Carnegie Institution of Washington, Boston. *II., Bearing on neuro-muscular processes and mental condition:* WALTER R. MILES, Nutrition Laboratory, Carnegie Institution of Washington, Boston. *III., Influence on efficiency during muscular work:* H. MONMOUTH SMITH, Nutrition Laboratory, Carnegie Institution of Washington, Boston.

Possible action of the sex-determining mechanism: C. E. MCCLUNG, Zoological Laboratories, University of Pennsylvania.

The study of the sediments as an aid to the earth historian: ELIOT BLACKWELDER, Department of geology, University of Illinois.

The growth of the Alaskan fur seal herd between 1912 and 1917: G. H. PARKER, United States Seal Investigation, 1914. Since 1912 the steady increase in the numbers of pups born, and of harem bulls and the decrease since 1913 of the average harem are most favorable signs in the growth of the herd. The one unfavorable feature during this period is the considerable increase in idle bulls in 1915, 1916 and especially in 1917. This in-

crease, which can be eventually checked, shows that active commercial killing should have been restored some years ago.

The destruction of tetanus antitoxin by chemical agents: W. N. BERG and R. A. KELSEY, Pathological Division, Bureau of Animal Industry, Washington. The results indicate that tetanus antitoxin a substance of non-protein nature, but the stability of the antitoxin is so dependent upon that of the protein to which it is attached, that whenever the protein molecule is split, the antitoxin splits with it.

Tests for fluorine and tin in meteorites with notes on maskelynite and the effect of dry heat on meteoric stones: GEORGE P. MERRILL, Department of Geology, United States National Museum, Washington.

Notes on isotopic lead: FRANK WIGGLESWORTH CLARKE, United States Geological Survey, Washington. Investigations on the atomic weight of various forms of lead, and radioactive estimates of the age of minerals, are analysed for the purpose of throwing light upon isotopes and the structure of chemical elements.

THE seventh number of Volume 4 contains the following articles:

On the representation of a number as the sum of any number of squares, and in particular of five or seven: G. H. HARDY, Trinity College, Cambridge, England.

The crystal structure of ice: ANCEL ST. JOHN, Department of Physics, Lake Forest College. Ice is properly assigned to the hexagonal system, and consists of four interpenetrating triangular lattices, of which the fundamental spacings have been obtained.

Fringing reefs of the Philippine Islands: W. M. DAVIS, Department of Geology and Geography, Harvard University. An interpretation of recently published large-scale charts of the United States Coast and Geodetic Survey.

Dilation of the great arteries distal to partially occluding bands: WILLIAM S. HALSTEAD, Medical School, Johns Hopkins Uni-

versity. The relative amount of constriction required to give the most pronounced results has been determined, so that the author is able, in almost every instance, to produce the dilation, and a large amount of material thereby accumulated is analyzed.

On the correction of optical surfaces: A. A. MICHELSON, Ryerson Physical Laboratory, University of Chicago.

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SPECIAL ARTICLES

INVESTIGATIONS ON THE IMBIBITION OF WATER BY GELATINE

MANY investigators in both botany and zoology have recently been at work on the absorption of water by gelatine and other colloidal jellies and from their results have drawn some extremely interesting conclusions regarding physiological behavior. However as the published results accumulate many apparent discrepancies in actual experimental results are appearing. In an attempt to investigate some phases of imbibition by gelatine, I found difficulty in making my conclusions agree with those of previous workers and even in duplicating my own results. In the course of this work certain phenomena of the behavior of gelatine itself came to light and I am offering the following account of some of the preliminary work which I found necessary, in the hope that it may save other workers needless trouble and perhaps help to clear up some of the discrepancies referred to.

Various authors have emphasized the necessity for using material of a constant chemical composition, and for conducting all comparable tests at the same temperature, but the importance of an identical history of water-content and of water-loss seems to have been overlooked.

As was to be expected, the water-content of the gelatine at the beginning of the absorption, strongly influences the rate of water uptake. However, even when different lots of gelatine have the same water-content at the beginning of the absorption, their ability to